[NAME OF DOCUMENT] SPECIFICATION

[TITLE OF THE INVENTION]

OPTICAL RECORDING MEDIUM, METHOD FOR OPTICALLY RECORDING DATA IN OPTICAL RECORDING MEDIUM AND AN APPARATUS FOR OPTICALLY RECORDING DATA IN OPTICAL RECORDING MEDIUM

[CLAIMS]

[Claim 1] An optical recording medium comprising a recording layer, a first dielectric layer disposed on the side of a light incidence plane with respect to the recording layer, a second dielectric layer disposed on the side opposite from the light incidence plane with respect to the recording layer, a heat radiation layer disposed on the side of the light incidence plane with respect to the first dielectric layer and a reflective layer disposed on the side opposite from the light incidence plane with respect to the second dielectric layer, the recording layer containing a phase change material represented by an atomic composition formula: $Sb_aTe_bGe_cMn_d$, where the value of a is equal to or larger than 57 and equal to or smaller than 74, the value of c is equal to or larger than 2 and equal to or smaller than 10, the value of d is equal to or larger than 5 and equal to or smaller than 20, the value of $(a + d)$ is equal to or larger than 74 and equal to or smaller than 81 and the value of a/b is equal to or larger than 2.9 and equal to or smaller than 4.7.

[Claim 2] The optical recording medium in accordance with Claim 1, wherein the heat radiation layer contains aluminum nitride AlN as a primary component.

[Claim 3] The optical recording medium in accordance with Claim 1 or 2, wherein the reflective layer contains Ag or alloy containing Ag as a primary component.

[Claim 4] The optical recording medium in accordance with any one of Claims 1 to 3, wherein the first dielectric layer has a thickness of 10 nm to 40 nm.

[Claim 5] The optical recording medium in accordance with any one of Claims 1 to 4, wherein the second dielectric layer has a thickness of 3 nm to 16 nm.

[Claim 6] The optical recording medium in accordance with Claim 5, wherein the phase change material represented by the atomic composition formula: $Sb_aTe_bGe_cMn_d$ has such a composition that the value of d is equal to or larger than 11 and equal to or smaller than 20 and the second dielectric layer has a thickness of 3 nm to 12 nm.

[Claim 7] The optical recording medium in accordance with any one of Claims 1 to 6, wherein the phase change material represented by the atomic composition formula: $Sb_aTe_bGe_cMn_d$ has such a composition that that the value of a is equal to or larger than 60 and equal to or smaller than 70, the value of c is equal to or larger than 2 and equal to or smaller than 10, the value of d is equal to or larger than 11 and equal to or smaller than 16, the value of $(a + d)$ is equal to or larger than 77 and equal to or smaller than 79 and the value of a/b is equal to or larger than 3.2 and equal to or smaller than 4.5.

[Claim 8] The optical recording medium in accordance with any one of Claims 1 to 7, in which the phase change material represented by the atomic composition formula: $Sb_aTe_bGe_cMn_d$ has such a composition that that the value of *d* is equal to or larger than 5 and equal to or smaller than 16 and which stores recording condition setting information necessary for setting a linear recording velocity to be equal to or higher than 14 m/sec and lower than 21 m/sec, thereby recording data therein.

[Claim 9] The optical recording medium in accordance with any one of Claims 1 to 7, in which the phase change material represented by the atomic composition formula: $Sb_aTe_bGe_cMn_d$ has such a composition that that *d* is equal to or larger than 11 and equal to or smaller than 20 and which stores recording condition setting information necessary for setting a linear recording velocity to be equal to or higher than 21 m/sec and lower than 33 m/sec, thereby recording data therein.

[Claim 10] The optical recording medium in accordance with any one of Claims 1 to 7, in which the phase change material represented by the atomic composition formula: $Sb_aTe_bGe_cMn_d$ has such a composition that that the value of *d* is equal to or larger than 11 and equal to or smaller than 16 and which stores recording condition setting information necessary for setting a linear recording velocity to be equal to or higher than 21 m/sec and lower than 33 m/sec, thereby recording data therein.

[Claim 11] The optical recording medium in accordance with any one of Claims 1 to 10, which stores recording condition setting information necessary for determining the number of recording pulses having a level equal to a recording power at the time of forming a record mark having a

length of n times one cycle of the reference clock to be $n/2$ when n is an even number and to be $(n + 1)/2$ or $(n - 1)/2$ when n is an odd number.

[Claim 12] The optical recording medium in accordance with Claim 11, which stores the recording condition setting information necessary for setting a ratio Pe/Pw of an erasing power of a laser beam Pe to a recording power Pw thereof to be equal to or larger than 0.26 and equal to or smaller than 0.51, thereby recording information therein.

[Claim 13] The optical recording medium in accordance with any one of Claims 1 to 12, which further comprises a substrate disposed on the side opposite from the light incidence plane with respect to the recording layer and a light transmission layer disposed on the side of the light incidence plane with respect to the heat radiation layer and wherein the reflective layer, the second dielectric layer, the recording layer, the first dielectric layer, the heat radiation layer and the light transmission layer are formed on the substrate.

[Claim 14] A method for optically recording data in an optical recording medium whose recording layer containing a phase change material represented by an atomic composition formula: $Sb_aTe_bGe_cMn_d$, where the value of a is equal to or larger than 57 and equal to or smaller than 74, the value of c is equal to or larger than 2 and equal to or smaller than 10, the value of d is equal to or larger than 5 and equal to or smaller than 20, the value of $(a + d)$ is equal to or larger than 74 and equal to or smaller than 81 and the value of a/b is equal to or larger than 2.9 and equal to or smaller than 4.7, the method comprising a step of recording data in the optical recording medium by determining the number of

recording pulses having a level equal to a recording power at the time of forming a record mark having a length of n times one cycle of the reference clock to be $n/2$ when n is an even number and to be $(n + 1)/2$ or $(n - 1)/2$ when n is an odd number.

[Claim 15] The for optically recording information in an optical recording medium in accordance with Claim 14, which further comprises steps of setting a ratio Pe/Pw of an erasing power of a laser beam Pe to a recording power Pw thereof to be equal to or larger than 0.27 and equal to or smaller than 0.51 and setting a linear recording velocity to be equal to or higher than 14 m/sec and lower than 21 m/sec, thereby recording data therein.

[Claim 16] The for optically recording information in an optical recording medium in accordance with Claim 14, which further comprises steps of setting a ratio Pe/Pw of an erasing power of a laser beam Pe to a recording power Pw thereof to be equal to or larger than 0.26 and equal to or smaller than 0.47 and setting a linear recording velocity to be equal to or higher than 21 m/sec and lower than 33 m/sec, thereby recording data therein.

[Claim 17] An apparatus for optically recording data in an optical recording medium whose recording layer containing a phase change material represented by an atomic composition formula: $Sb_aTe_bGe_cMn_d$, where the value of a is equal to or larger than 57 and equal to or smaller than 74, the value of c is equal to or larger than 2 and equal to or smaller than 10, the value of d is equal to or larger than 5 and equal to or smaller than 20, the value of $(a + d)$ is equal to or larger than 74 and equal to or